UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/568,904	12/07/95	WATTS L	TI-20567

LM21/1014

RONALD O NEERINGS
TEXAS INSTRUMENTS INCORPORATED
P O BOX 655474, MS 219
DALLAS TX 75265

EXAMINER	
DHARIA,R	
ART UNIT	PAPER NUMBER
2781	14

DATE MAILED: 10/14/98

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No. 08/568,904	Applicant(s) Watts Jr.
	Examiner Rupal D. Dharia	Group Art Unit 2781

☒ Responsive to communication(s) filed on *Jul 31, 1998*.

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire *three* month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) *2, 3, 5, 6, 9, 17-21, 23, 30, 31, 34-39, 41-43, 45-47, 49-51, and 53-55* 53-55, 57-59, 61-63, 65-67 and 71-73, is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) *2, 3, 5, 6, 9, 17-21, 23, 30, 31, 34-39, 41-43, 45-47, 49-51, and 53-55* 57-59, 61-63, 65-67 and 71-73. is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐approved ☐disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____.

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☐ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

Part III DETAILED ACTION

Claim Rejections - 35 USC § 112

1. Claim 9 rejected under 35 U.S.C. 112, second paragraph, has been amended to overcome the rejection.

Double Patenting

2. Claims 60, 64, and 68 have been canceled and thus the double patenting rejection is moot.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
>
> Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

4. Claims 2-3, 5-6, 9, 30-31, 34-39, 41-43, 45-47, 49-51, 53-55, 57-59, 61-63, 65-67, and 71-73 are rejected under 35 U.S.C. § 103 as being unpatentable over Hollowell, II et al. in view of Kikinis and further in view of Gephardt et al.

As per claims 2, 3, 5, and 9, Hollowell discloses the claimed invention including a provision for user input (Fig. 1); a provision for output (Fig. 1); a CPU coupled to the input and output (Fig. 1; col. 4, lines 6-7); the input is a keyboard (Fig. 1; col. 4, lines 42-44); the output is a display device (Fig. 1; col. 4, lines 21-22); a temperature level detector (Fig. 1; col. 4, lines 47-48); and a thermal management system that stops the power to the CPU when the temperature detected exceeds a reference temperature (Abstract; Fig. 2). However, Hollowell does not teach stopping the clock signals when a detected temperature rises above a reference temperature level. Kikinis teaches a system for controlling temperature buildup in an IC which employs a temperature sensor to provide an indication of the IC temperature to a control circuit which is configured to adjust the clock speed based upon a function of the temperature of the IC or its package (Abstract). Further, Kikinis teaches that it is known to selectively stop clock signals when the detected temperature rises above a reference temperature level (Abstract; Fig. 3, 6). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the selectively stopping the clock signals based upon rising temperatures exceeding a reference temperature as taught by Kikinis, to monitor the temperature levels in the computer, to prevent excessive temperature which may damage vital components or circuitry.

Hollowell and Kikinis disclose the claimed invention as discussed above. However, Hollowell does not teach a monitor stopping the clock signals to the CPU only when the CPU is not processing critical I/O. Gephardt teaches a power management that monitors CPU activity

and dependent upon the type of activity, controls the frequencies of the CPU clock signal and system clock signal (Abstract; Fig. 6). Furthermore, Gephardt teaches the clock signals be raised if certain system activities are detected and to be lowered if certain other activities are detected (col. 2, lines 23-32, lines 64-67; col. 3, lines 1-34). It would have been obvious to one having ordinary skill in the art at the time the invention was made to stop the clock only when the CPU is processing non-critical I/O as taught by Gephardt, to prevent losing any vital information or processing that may occur during an I/O operation.

As per claim 6, Hollowell, Kikinis and Gephardt disclose the claimed invention as discussed above. However, Hollowell does not teach a CPU receiving a one of a first clock signal at a first speed or a second clock signal at a second speed and the CPU receives the first clock signal when the temperature is below the reference temperature and the receives the second clock signal when the temperature is greater than or equal to the reference temperature. Kikinis teaches that it is known to provide first and second clock signals with first and second speeds to the CPU (col. 4, lines 23-53). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the above as taught by Kikinis, to provide different clock speeds based upon the required load of the CPU.

As per claims 30 and 31, Hollowell and Kikinis disclose the claimed invention as described in the above claims. However, Hollowell and Kikinis do not teach the clock manager stops clock signals from being sent to a PCI bus coupled to the CPU or any other CPUs coupled to the PCI bus. Gephardt teaches that the above features are well known (Fig. 2, col. 11, lines 13-21). It

would have been obvious to one of ordinary skill in the art at the time the invention was made to include the above features, as taught by Gephardt to more efficiently conserve power by managing power also to external devices.

As per claims 33-39, Hollowell, Kikinis, and Gephardt disclose the claimed invention as described above. However, Hollowell does not teach the monitor is on board the CPU and the monitor detects via a temperature sensor. Kikinis teaches that it is known to have a monitor on the board with the CPU and the monitor detects via a temperature sensor (Fig. 2, 3; col. 3, lines 8-10). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features as taught by Kikinis, to provide an accurate and efficient way to measure temperature.

As per claims 41-43, 45-47, and 49-51, Hollowell, Kikinis, and Gephardt disclose the claimed invention as described above. Furthermore, Hollowell and Kikinis teach that the temperature sensor is located on the CPU board (Fig. 1) or on the CPU (Fig. 3). The location of the temperature sensor is dependent upon the area of concern. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to locate the temperature sensor as taught by Hollowell and Kikinis to provide the system designer the freedom to measure in close proximity to area of temperature concern.

As per claim 53-55, Hollowell, Kikinis and Gephardt disclose the claimed invention as described above. Furthermore, Hollowell teaches the temperature sensing device may be a thermistor (col. 6, lines 31-33).

As per claim 57-59, Hollowell, Kikinis and Gephardt disclose the claimed invention as described above. Furthermore, Hollowell teaches the temperature sensing is monitored periodically (col. 6, lines 46-47).

As per claim 61-63, Hollowell, Kikinis and Gephardt disclose the claimed invention as described above. Furthermore, Hollowell teaches the frequency of temperature sensing changes as the temperature reaches a preselected threshold value (col. 7, lines 44-50).

As per claim 65-67, Hollowell, Kikinis and Gephardt disclose the claimed invention as described above. However, Hollowell does not teach that the temperature sensing is user modifiable. Kikinis teaches that it is known for the temperature sensing to be user modifiable (col. 5, lines 64-66). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the user modifiable temperature sensing as taught by Kikinis to give the user the flexibility to adjust the temperature sensing for testing purposes.

As per claim 71-73, Hollowell, Kikinis and Gephardt disclose the claimed invention as described above. However, Hollowell does not teach the monitor uses a control system of continuous feedback loops. Kikinis teaches that it is known to use a control system of continuous feedback loops (Fig. 3). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the continuous feedback loops as taught by Kikinis, to maintain and regulate the temperature in the IC to prevent large temperature swings which causes excess power and could cause physical damage to the components.

5. Claims 17-21, and 23, are rejected under 35 U.S.C. 103(a) as being unpatentable over Hollowell, II et al in view of Kikinis and further in view of Chen et al.

As per claims 17, 18 and 21, Hollowell and Kikinis disclose the claimed invention including monitoring temperature levels in a computer. However, Hollowell and Kikinis do not teach predicting activity and temperature levels relevant to the operation of a CPU within the computer and using the predictions for automatic temperature control. Chen teaches that it is known to predict activity levels within a computer and using the prediction for automatic control and also, remain transparent to the user (col. 7, lines 4-24). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the above as taught by Chen, since having the capability to predict temperature rises and automatically control them, prior to the occurrence could prevent premature failure of the CPU or circuit components.

As per claims 19, 20, and 23, Hollowell and Kikinis teach the disclosed invention as claims 17, 18, and 23 above. However, Hollowell and Kikinis do not teach user modification of automatic activity and temperature level predictions and using modified predictions for automatic temperature control. Chen teaches that it is known to allow user modification of automatic activity level predictions and using the modified predictions for automatic control (col. 7, lines 5-43; col. 8, lines 1-6). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the above as taught by Chen, since allowing the user to modify temperature levels would allow for different manufacturer's components that have various temperature specifications.

Response to Arguments

6. Applicant's arguments filed 7/31/98 have been fully considered but they are not persuasive.

a. In response to applicant's arguments that Gephardt does not teach "critical activity" it is noted that Gephardt teaches detected activities and list some of the type that are detected, and also Gephardt teaches that other selected activities may be programmed as either primary or secondary activities (col. 3, lines 30-33). Thus, Gephardt reads on the claims limitations of detecting "critical activity". As Applicant's claims are currently written, the cited references are sufficient to overcome this argument.

b. In response to applicant's arguments that Gephardt does not teach, stopping or reduces clock speed when said clock speed rises to a level at and above a selected reference temperature level and said CPU is not processing critical I/O, it is noted that Gephardt teaches that the CPU clock signal is stopped during the suspend state (col. 3, lines 14-15). Furthermore, Gephardt teaches the steps of detecting activity of the processor and providing a clock control signal to the CPU clock (col. 3, lines 50-61). Also, Gephardt teaches the power management unit can be configured to control only selected clock signals of the computer system or to control only the application of power to various peripheral device (col. 11, lines 15-21). Finally, Hollowell and Kikinis are cited to teach the limitations of the thermal management system and stop the clock signals rise above a reference temperature level. The combination of Gephardt into the system of Hollowell and Kikinis teaches the claimed limitations. Gephardt adjusts the clock based upon detected activity and Kikinis also adjusts the clock based upon detected activity, thus, the cited

references are both in the same field of endeavor and by reducing the clock as taught by Gephardt into the system of Kikinis, reduces the power consumption which reduces heat generation and thereby increases reliability and decreases cost. As Applicant's claims are currently written, the cited references are sufficient to overcome this argument.

c. In response to applicant's arguments that Chen does not teach, sampling temperature levels and predicting temperature levels associated with the operation of the central processing unit and using the prediction for automatic control of temperature within the computer, it is noted that Chen teaches that it is known to predict heat accumulation and heat dissipation as functions of both time and operating frequency and the system provides temperature control based upon a selected model (col. 1, lines 34-38). Furthermore, Chen teaches the microprocessor operates with different speed modes which cause heating of the device and increased power consumption which leads to overheating of a chip and to thermal instabilities and then to failure of transistors of the entire chip (col. 1, lines 11-18). Thus, Chen reads on the claim limitations as currently cited. As Applicant's claims are currently written, the cited references are sufficient to overcome this argument.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rupal Dharia whose telephone number is (703) 305-4003. The examiner can normally be reached on Monday-Thursday from 7:00 AM to 4:30 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ayaz Sheikh, can be reached on (703) 305-9648. The fax phone number for this Group is (703) 308-5358.

Communications via Internet e-mail regarding this application, other than those under 35 U.S.C. 132 or which otherwise require a signature, may be used by the applicant and should be addressed to [**ayza.sheikh@uspto.gov**].

All Internet e-mail communications will be made of record in the application file. PTO employees do not engage in Internet communications where there exists a possibility that sensitive information could be identified or exchanged unless the record includes a properly signed express waiver of the confidentiality requirements of 35 U.S.C. 122. This is more clearly set forth in the Interim Internet Usage Policy published in the Official Gazette of the Patent and Trademark on February 25, 1997 at 1195 OG 89.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-3900.

RDD

October 8, 1998

AYAZ R. SHEIKH
SUPERVISORY PATENT EXAMINER
GROUP 2700